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*GIREP-EPEC conference 2023*  
*Physics learning promoting culture*  
*and addressing societal issues*

Contribution ID: 37

Type: **Oral presentation**

## **A multi-representational simulation to learn about vector fields**

*Thursday 6 July 2023 14:20 (20 minutes)*

Vector fields, differential operators, and the integral theorems of Gauss and Stokes are a central part of Maxwell's equations to describe electric and magnetic fields. For physics applications, a conceptual understanding is of particular importance, which often causes difficulties for students. Therefore, previous research emphasizes the need to foster conceptual knowledge by multi-representational approaches. For that purpose, this contribution presents a vector field simulation that addresses empirical findings on student difficulties and aims to promote a visual understanding of vector fields and differential operators. Additionally, findings of an implementation study integrating the simulation in recitation-based learning tasks are presented.

### **How would you like to present your contribution?**

Live in Košice (time slot to be allotted based on the programme)

### **Target education level (primary)**

University education

### **Target education level (secondary, optional)**

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**Session Classification:** Innovative strategies at University

**Track Classification:** Innovative strategies and pathways to improve physics education at university